

Thailand : Energy Data, Statistics and Analysis - Oil, Gas, Electricity, Coal

Thailand is a net importer of oil and natural gas, although the country is a growing producer of natural gas.

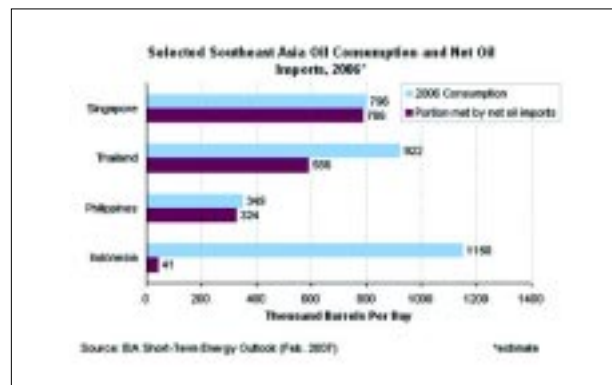
Background

Thailand has limited domestic oil production and reserves, and imports make up a significant portion of the country's oil consumption. Thailand holds large proven reserves of natural gas, and natural gas production has increased substantially over the last few years. However, the country still remains dependent on imports of natural gas to meet growing domestic demand for the fuel.



In September 2006, a military coup overthrew the government of Prime Minister Thaksin Shinawatra. The change in leadership did not have any immediate impact on oil or natural gas production. During 2006, Thailand's real gross domestic product (GDP) grew by an estimated 5.0 percent, right on trend with average 5-year growth levels.

According to Oil & Gas Journal (OGJ), Thailand held 290



million barrels of proven oil reserves as of January 2007. In 2006, Thailand produced an estimated 336,000 barrels per day (bbl/d) of total oil liquids, of which 130,000 bbl/d was crude oil, 76,000 bbl/d was lease condensate, and 111,000 bbl/d was natural gas liquids, and the remainder was refinery gain. Thailand consumed an estimated 922,000 bbl/d of oil in 2006, leaving net imports of 586,000 bbl/d, the second largest among Southeast Asian countries.

Sector Organization

The oil industry in Thailand is dominated by PTT, formerly the Petroleum Authority of Thailand. Although PTT is considered a national oil company (NOC), the company underwent a partial privatization in 2001, during which 32 percent of its equity was sold through the Bangkok Stock Exchange. However, Thailand's Supreme Administrative Court (SAC) is currently considering

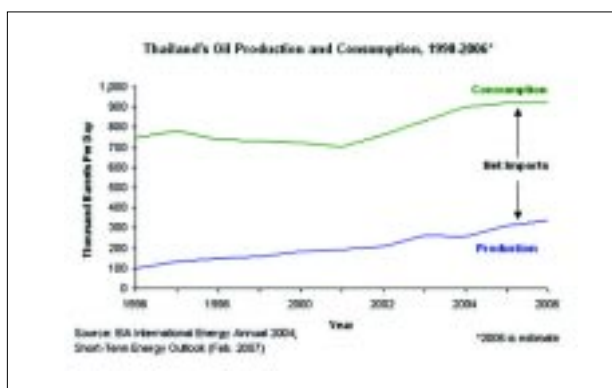
a proposal to reverse the sale of PTT's shares. The court is set to issue a verdict by mid-2007, which could see PTT forced to repurchase the shares sold to investors in 2001. In a similar case, the SAC ruled in March 2006 that the privatization of EGAT, the national power utility, was carried out illegally, forcing the company to delist its shares from the Thailand's stock exchange.

Thailand's oil sector is open to foreign involvement, although foreign companies often work in joint ventures with PTT Exploration and Production (PTTEP), PTT's upstream subsidiary. Foreign companies supply the bulk of Thailand's domestic oil production, with the largest volumes coming from Chevron. Some analysts speculate that if PTT's privatization is reversed, foreign company interest in Thailand's oil sector could wane, although this remains to be seen. PTT has a considerable presence in Thailand's downstream sector, with stakes in all four of the country's refineries as well as equity interests in downstream subsidiaries Thai Oil Company (Thaioil) and the Thai Petroleum Pipeline Company (Thappline).

The Energy Policy and Planning Office (EPPO), which is part of Thailand's Ministry of Energy, oversees all aspects of the country's energy policies, including the oil, natural gas, and power sectors. The National Economic and Social Development Board oversees large energy infrastructure projects and also assists in the policy planning process.

Exploration and Production

Thai oil production has risen in the last few years, although production remains well below consumption levels. About 85 percent of the country's



crude oil production comes from offshore fields in the Gulf of Thailand. Chevron is the largest oil producer in Thailand, accounting for more than three-fourths of the country's crude oil and condensate production during 2006. Significant oil fields in Thailand include Chevron's Benchamas, Pailin, and Fiel fields, as well as PTTEP's Bongkot and Sirikit fields.

PTTEP and various foreign companies continue to aggressively explore for oil reserves throughout Thailand, although companies have had much more success locating additional natural gas reserves in recent years. Thailand announced the results of the country's 19th Petroleum Concession Bidding Round in November 2006. PTTEP added several new blocks to its upstream portfolio, and the Thai government awarded exploration rights to several small foreign and private oil companies, including Pan Orient Energy, Pearl Oil, Northern Gulf Oil, and Occidental Petroleum.

Overseas E&P

PTTEP officials have announced plans to increase the company's upstream activities abroad, noting that domestic exploration and production (E&P) potential is becoming increasingly limited. To date, much of PTTEP's overseas investments have focused on other Southeast Asian countries, including Burma, Cambodia, Indonesia, and Malaysia. However, PTTEP has also invested in E&P projects in Algeria, Iran, and Oman, and has considered upstream investments in several other countries.

Pipelines

PTT established its subsidiary, Thai Petroleum Pipeline Company (Thappline), in 1991 to develop the country's first oil pipeline. The main trunk line runs from the Sri Racha Oil Terminal in the south to the northern Lumlukka and Saraburi terminals. All told, Thappline's oil pipeline infrastructure consists of the 160-mile trunk line and 70 miles of additional local spurs, which most analysts consider inadequate to meet the country's growing oil demand requirements. Thailand does not currently have any international oil pipeline connections.

Downstream Activities

According to OGI, Thailand had 729,100 bbl/d of refining capacity at four facilities as of January 2007.

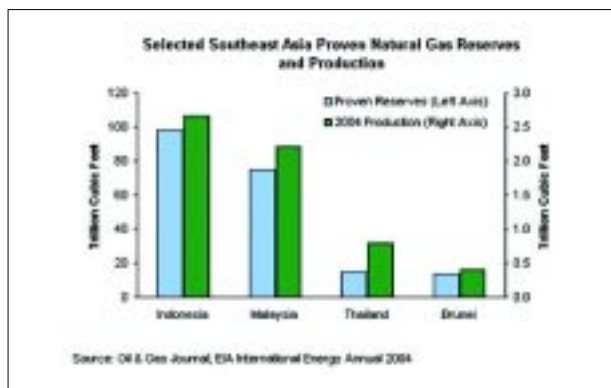
The largest refinery is the 301,000-bbl/d plant at Map Ta Phut, which is owned by Alliance Refining Company (ARC), a joint venture between Chevron and PTT. Other refineries include the ExxonMobil-operated plant at Sri Racha (173,500 bbl/d capacity), Thai Oil Company's facility at Sri Racha (192,850 bbl/d), and PTT's Bangkok refinery (61,750 bbl/d).

The Thai government has introduced tax subsidies to encourage oil companies to develop additional refining capacity in the country, both to meet expected higher demand for petroleum products domestically but also to serve export markets in the region. The government hopes to promote Thailand as an oil refining and trading center that would rival Singapore.

Natural Gas

Several new projects

According to OGI, Thailand held 14.8 trillion cubic feet (Tcf) of proven natural gas reserves as of January 2007. Almost all of the country's natural gas fields are



located offshore in the Gulf of Thailand. Natural gas production has risen steadily in recent years, although not enough to keep up with the growth in domestic consumption.

Thailand produced 790 billion cubic feet (Bcf) of natural gas in 2004, while consuming 1,055 Bcf. The country showed net natural gas imports of 265 Bcf in 2004, which consisted mostly of piped imports from Burma.

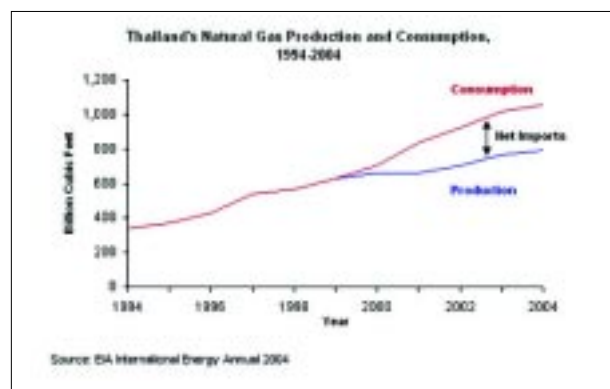
Sector Organization

PTTEP has a stake in many of Thailand's natural gas producing fields, including Bongkot, the country's largest. Foreign companies, however,

supply the bulk of Thailand's natural gas output. Chevron is the largest foreign operator, accounting for 70 percent of the country's natural gas production from 22 offshore fields. PTT has a leading position in mid- and downstream natural gas activities, including much of Thailand's domestic transmission and distribution infrastructure.

Exploration and Production

There are several ongoing projects that will increase Thailand's natural gas supplies in the next few years. The largest of these is PTTEP's Arthit project, which is off the coast of Songkhla, about



350 miles south of Bangkok. The company expects to start production at the main Arthit field during the first quarter of 2008 at a rate of 330 million cubic feet per day (MMcf/d). PTTEP was originally scheduled to bring the field online in April 2007, but the company stated that equipment shortages would delay the start-up. PTTEP also has plans to begin natural gas production from the Arthit North field during the second half of 2008, initially producing at a rate of 120 MMcf/d.

Malaysia-Thailand Joint Development Area

Ongoing projects from the Malaysia-Thailand Joint Development Area (JDA), located in the lower part of the Gulf of Thailand, will also increase natural gas supplies to Thailand in future. The area is divided into three blocks, Block A-18, Block B-17, and Block C-19, and is administered by the Malaysia-Thailand Joint Authority (MTJA), with each country owning 50 percent of the JDA's hydrocarbon resources. Sources estimate that the JDA holds 9.5 Tcf of proved plus probable natural gas reserves, and some analysts speculate

that the area could hold as much as 24 Tcf total in-place reserves (for more information, see the Malaysia Country Analysis Brief).

Production at Block A-18 started in 2005, although all natural gas from the field currently goes to Malaysia. Thailand will begin taking deliveries from A-18 in April 2007, once PTT completes a pipeline linking the JDA with its Arthit field pipeline system. Initial flows are expected to be 200 MMcf/d, eventually rising to 400 MMcf/d in 2008, and 550 MMcf/d by the end of 2010. Thailand was not originally scheduled to receive natural gas from Block A-18 until 2008, but decided to bring the schedule forward to make up for delays at the Arthit field.

The Carigali-PTTEP Operating Company (CPOC), a joint venture of the E&P arms of the Thai and Malaysian national oil companies, operates Blocks B-17 and C-19 in the JDA. CPOC expects to start natural gas production from B-17 in the second half of 2009 at an initial rate of 270 MMcf/d, with plans to increase output to 420 MMcf/d in 2010. CPOC also plans to start production at the smaller Block C-19 sometime after 2009, although no production timetable is set.

Pipelines

Whereas Thailand's oil pipeline system is rather limited in scale, the country's natural gas transmission infrastructure is much more advanced. PTT Natural Gas Distribution (PTTNGD) currently has more than 2,300 miles of total natural gas transmission pipelines throughout the country. Thailand has two major natural gas pipelines linking the offshore Erawan field with Rayong, with a combined capacity of 2.65 Bcf/d. PTTNGD completed construction on the country's third major natural gas pipeline in early 2007, which will pump natural gas from the new Arthit project to the east coast town of Pattaya. The line will have an initial capacity to handle 700 MMcf/d, eventually expanding to 1.9 Bcf/d in late 2008, when PTT installs a compressor unit. However, the company expects that the pipeline will only run at 60 percent capacity for 2007 and 2008, and is expected to run at its full 1.9 Bcf/d capacity beginning in 2010.

International Connections

The 410-mile Thai-Burmese natural gas pipeline,

running from Burma's Yadana gas field in the Andaman Sea to an Electricity Generating Authority of Thailand (EGAT) power plant in Ratchaburi province, was completed in mid-1999. As a result of the Asian Financial Crisis and Thailand's ensuing currency crash, Thailand did not begin to fully honor its gas purchase agreement until 2002, when it renegotiated the contract. Today, the Ratchaburi power station consumes only 150 MMcf/d of natural gas rather than the originally contracted amount of 525 MMcf/d.

As part of the ongoing projects in the JDA described above, the Trans-Thailand-Malaysia (TTM) Gas Pipeline System has been developed to connect the JDA natural gas fields with each country's domestic transmission system. The TTM pipeline currently delivers natural gas to the Malaysian market, and will begin sending natural gas to Thailand in April 2007. The effort is a major component of the proposed "Trans-ASEAN Gas Pipeline" (TAGP) system, which envisions the establishment of a transnational pipeline network linking the major natural gas producers and consumers in Southeast Asia.

Liquefied Natural Gas

PTT has established a subsidiary, PTTLNG, to study the feasibility of building a liquefied natural gas (LNG) import and storage terminal in Thailand. PTTLNG is considering a 5 million metric ton per year (244 Bcf/y) facility at Map Ta Phut in Rayong. In October 2006, PTTLNG opened a prequalification tender process to gauge supplier interest in the proposed terminal. If the company proceeds with the plan, it expects the LNG facility to be ready by 2011. PTT would also start construction in 2008 or 2009 on a fourth major pipeline to deliver regasified natural gas from Map Ta Phut to domestic end users.

Some industry sources have questioned the need for an LNG import terminal in Thailand, noting that the country already expects to receive substantial additional gas flows from the Arthit and JDA projects. The Thailand-Burma pipeline is also running at less than full capacity, and represents a possible source of additional natural gas supplies to Thailand. However, adding LNG imports to Thailand's mix of natural gas supplies would add an additional layer of security of supply by diversifying the country's import sources.

Profile

Country Overview	
Interim Prime Minister Sonthi Boonyaratglin)	Surayut Chulalon (since 1 October 2006; note: Prime Minister Thaksin Shinawatra was overthrown on 19 September 2006 in a coup led by General
Chief of State	King Phumiphom Adunyadet (since 9 June 1946)
Location southeast of Burma	Southeastern Asia, bordering the Andaman Sea and the Gulf of Thailand,
Population (2006E)	64,631,595
Economic Overview	
Minister of Industry	Khosit Panpiamrat
Currency/Exchange Rate (16 March 2007)	1 USD = 33.024 Thai Baht
Inflation Rate (2006E)	4.6%
Gross Domestic Product (GDP, 2006E) Real	\$206.2 billion
GDP Growth Rate (2006E)	5.0%
Unemployment Rate (2006E)	2.1%
External Debt (2006E)	\$57.3 billion
Exports (2006E)	\$152.1 billion
Exports - Commodities computers and electrical appliances	textiles and footwear, fishery products, rice, rubber, jewelry, automobiles,
Exports - Partners (2005E) Malaysia 5.2%	US 15.4%, Japan 13.6%, China 8.3%, Singapore 6.9%, Hong Kong 5.6%,
Imports (2006E)	\$145.5 billion
Imports - Commodities	capital goods, intermediate goods and raw materials, consumer goods, fuels
Imports - Partners (2005E)	Japan 22%, China 9.4%, US 7.4%, Malaysia 6.8%, UAE 4.8%, Singapore 4.6%
Current Account Balance (2006E)	\$3.2 billion
Energy Overview	
Minister of Energy	Piyasawat Ammaranan
Proven Oil Reserves (January 1, 2007E)	290 million barrels
Oil Production (2006E)	336,000 barrels per day, of which 38% was crude oil.
Oil Consumption (2006E)	922,000 barrels per day
Crude Oil Distillation Capacity (January 1, 2007E)	729,100 barrels per day
Proven Natural Gas Reserves (January 1, 2007E)	14.8 trillion cubic feet
Natural Gas Production (2004E)	790 billion cubic feet
Natural Gas Consumption (2004E)	1,055 billion cubic feet
Recoverable Coal Reserves (2003E)	1,492 million short tons
Coal Production (2004E)	22.1 million short tons
Coal Consumption (2004E)	30.4 million short tons
Electricity Installed Capacity (2004E)	24.8 gigawatts
Electricity Production (2004E)	121.7 billion kilowatt hours
Electricity Consumption (2004E)	116.2 billion kilowatt hours

Total Energy Consumption (2004E)	3.4 quadrillion Btus*, of which Oil (54%), Natural Gas (30%), Coal (13%), Hydroelectricity (2%), Other Renewables (1%), Nuclear (0%)
Total Per Capita Energy Consumption (Million Btu) 2004E)	53.7 million Btus
Energy Intensity (2004E)	6,766.6 Btu per \$2000-PPP**
Environmental Overview	
Energy-Related Carbon Dioxide Emissions (2004E)	218.6 million metric tons, of which Oil (56%), Natural Gas (25%), Coal (19%)
Per-Capita, Energy-Related Carbon Dioxide Emissions ((Metric Tons of Carbon Dioxide) 2004E)	3.4 metric tons
Carbon Dioxide Intensity (2004E)	0.4 Metric tons per thousand \$2000-PPP**
Environmental Issues	air pollution from vehicle emissions; water pollution from organic and factory wastes; deforestation; soil erosion; wildlife populations threatened by illegal hunting
Major Environmental Agreements	party to: Biodiversity, Climate Change, Climate Change-Kyoto Protocol, Desertification, Endangered Species, Hazardous Wastes, Marine Life Conservation, Ozone Layer Protection, Tropical Timber 83, Tropical Timber 94, Wetlands signed, but not ratified: Law of the Sea
Oil and Gas Industry	
Organization	PTT, formerly the Petroleum Authority of Thailand, is a leading integrated oil and gas company that is majority-owned by the Thai government; International oil companies hold the largest share of oil and natural gas production
Selected Foreign Company Involvement	Amerada Hess, Chevron, ExxonMobil, Mitsui, Occidental Petroleum, Pearl Oil, Shell, Total
Major Refineries (capacity, bbl/d)	ARC: Map Ta Phut (301,000); ExxonMobil: Sri Racha (173,500); Thaioil: Sri Racha (192,850); PTT: Bangkok (61,750)

* The total energy consumption statistic includes petroleum, dry natural gas, coal, net hydro, nuclear, geothermal, solar, wind, wood and waste electric power. The renewable energy consumption statistic is based on International Energy Agency (IEA) data and includes hydropower, solar, wind, tide, geothermal, solid biomass and animal products, biomass gas and liquids, industrial and municipal wastes. Sectoral shares of energy consumption and carbon emissions are also based on IEA data.

**GDP figures from OECD estimates based on purchasing power parity (PPP) exchange rates.

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